Appendix 9

Construction

CONSTRUCTION METHODS AND ISSUES
KODIAK AIRPORT EIS

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Project Number 1123.59213.02

February 2012

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ACRONYMS

CGF ..... Coast Guard Facility
CL ..... centerline
DOT&PF ..... Department of Transportation and Public Facilities
EIS ..... Environmental Impact Statement
EMAS ..... Engineered Materials Arresting System
FAA ..... Federal Aviation Administration
MSL ..... Mean Sea Level
NAVD88 ..... North American Vertical Datum of 1988
NOTAM ..... Notice to Airmen
NTP ..... Notice to Proceed
RSA ..... Runway Safety Area
RW ..... runway
SWPPP ..... Stormwater Pollution Prevention Plan
USGC ..... United States Coast Guard
WWII ..... World War II

1.0 INTRODUCTION

The FAA is preparing an Environmental Impact Statement (EIS) for Kodiak Airport to assess the environmental impacts associated with the proposed expansion of the airport's Runway Safety Areas (RSAs). Several alternatives for RSA improvements at the airport have been proposed. Other than the "no build" alternatives, each of the alternatives consists of placing fill into the marine environment to expand each RSA beyond its existing configuration.

The purpose of this *Construction Methods and Issues* report is to provide a brief description of the preliminary engineering work performed so far and to discuss potential construction methods and schedules. This report was prepared to provide planning level information to the resource specialists who are assessing the impacts that could result from development of the proposed RSA improvements. This report does not contain detailed engineer design or analysis, but instead provides the details necessary for the EIS analysis. More detailed design engineering will be conducted independent of the EIS once the FAA has selected and approved a preferred alternative for implementation.

This report has been prepared under the direction of the FAA and is being coordinated within FAA divisions as well as with the Alaska Department of Transportation & Public Facilities (DOT&PF) and United States Coast Guard (USCG) among others.

2.0 ALTERNATIVES

The EIS being prepared by the FAA includes an assessment of three alternatives for the end of Runway 25 and seven alternatives for the ends of Runway 18/36. Although there are limited areas along the sides of both runways that do not meet the standards for RSA width and grading, there are no plans to correct these RSA deficiencies as part of this project because the lateral RSA improvements have a lower priority in the practicability assessment. However, if measures are taken to avoid environmental impacts and appropriate review is conducted, improvements to the lateral RSAs can be completed independent of the work being assessed in the EIS. Work

assessed in the EIS will be confined to the areas beyond the ends of the runways. For the south end of Runway 18/36, there would be a small amount of RSA work included on the east side of the Runway due to the shape of the coastline near the end of the runway.

The Federal Aviation Administration (FAA) has established a practicability threshold of $25 million dollars per runway for RSA improvements at Kodiak Airport and the RSA alternatives have been developed as an attempt to provide the maximum safety increase given the $25 million practicability limit. Several of the alternatives include an Engineered Materials Arresting System (EMAS) in an attempt to increase safety while minimizing the fill that must be constructed. The alternatives being assessed in the EIS are:

Runway 07/25 RSA

This is the east-west runway that is generally aligned with the prevailing winds. When winds are not a factor, this runway is favored by the commercial carriers because it minimizes taxi distance to the terminal apron. The runway pavement has a PCI of between 5 and 42.

- Alternative 1 – No Action
- Alternative 2 – Extend Runway end 25 RSA landmass by 600 feet and install 70kt EMAS on newly constructed landmass
- Alternative 3 – Extend Runway end 25 RSA landmass by 1000 feet

Runway 18/36 RSA

This is the northeast-southwest runway that is roughly parallel to the coast. When wind is not a factor, this runway is favored by the US Coast Guard because it minimizes taxi distance to their facility at the south end of the airport. The runway pavement has a PCI of between 34 and 66.

- Alternative 1 – No Action
- Alternative 2 – Extend Runway RSA to the south by 600 feet, to north by 240 feet and install 40kt EMAS on newly constructed landmass.
- Alternative 3 – Extend Runway RSA to south by 240 feet and to north by 450 feet and install 70kt EMAS on newly constructed landmass.

- Alternative 4 – Extend Runway RSA to south and north by 300 feet and install 40kt EMAS on newly constructed landmass.
- Alternative 5 – Extend Runway RSA to south and north by 600 feet.
- Alternative 6 – Extend Runway RSA to south by 400, to north by 400 feet and install 40kt EMAS on newly constructed landmass.
- Alternative 7 – Extend Runway RSA to south by 600 feet, shift Runway south 240 feet and install 40kt EMAS on existing pavement.

For Runway 07/25, the surface of the RSA will be covered with grass or gravel except for the paving required to install EMAS in Alternative 2.

For the Runway 18 and 36 alternatives, the RSA surface will be covered in grass or gravel except for the paving required to install EMAS for Runway 18 in alternatives 2, 3, 4, and 6; the paving required to install EMAS for runway 36 in alternative 4 and 6; and the extended runway pavement supporting the runway shift in alternative 7. The existing circular aircraft turn-around area at the ends of Runways 18 and 36 will be removed to allow the installation of runway edge lights along the runway.

The side slopes of all expanded RSAs will be covered in small diameter armor rock (1-2 feet). For the side slopes of the RSA that face toward the open ocean, large diameter armor rock (4-6 feet) will be placed on top of the small diameter armor rock. Armor will be designed and positioned to minimize water and debris on the runway surface.

3.0 TYPICAL SECTIONS AND CONSTRUCTION MATERIALS

The RSA expansions will generally consist of gravel fill surrounded by armor stone. The grading and dimensions of this fill will be according to FAA Advisory Circular 150/5300-13, *Airport Design*. Deep water fill will be constructed with filter rock, using construction methods to minimize turbidity caused by placement of fill.

3.1 RSA Elevations

The top elevation of the Safety Area will be generally the same as the existing runway threshold elevations as shown in the following table.

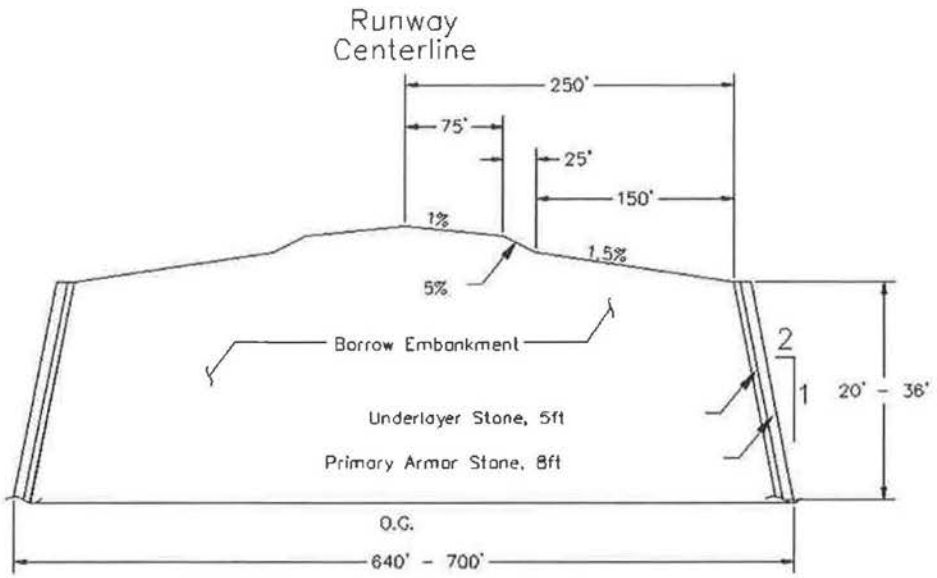
Table 1: Approximate RSA Elevations

Runway End	Elevation (ft, NAVD88)	Elevation (ft, MSL)	Elevation (ft, MLLW)
Runway 25	20.8	26.1	16.31
Runway 18	20.0	25.3	15.51
Runway 36	35.8	41.1	31.31

3.2 Typical Section

The top of the RSA fill section will be 500 feet wide centered on the extended runway centerline. Grading of the RSA surface, EMAS surfaces where applicable and for Runway pavement added in alternative 7 for runway 36, will be according to the following typical section. 2:1 side slopes will be used for all fill areas to ensure minimal impact.

Figure 1: Typical Section for RSA



3.3 Area Affected by Fill

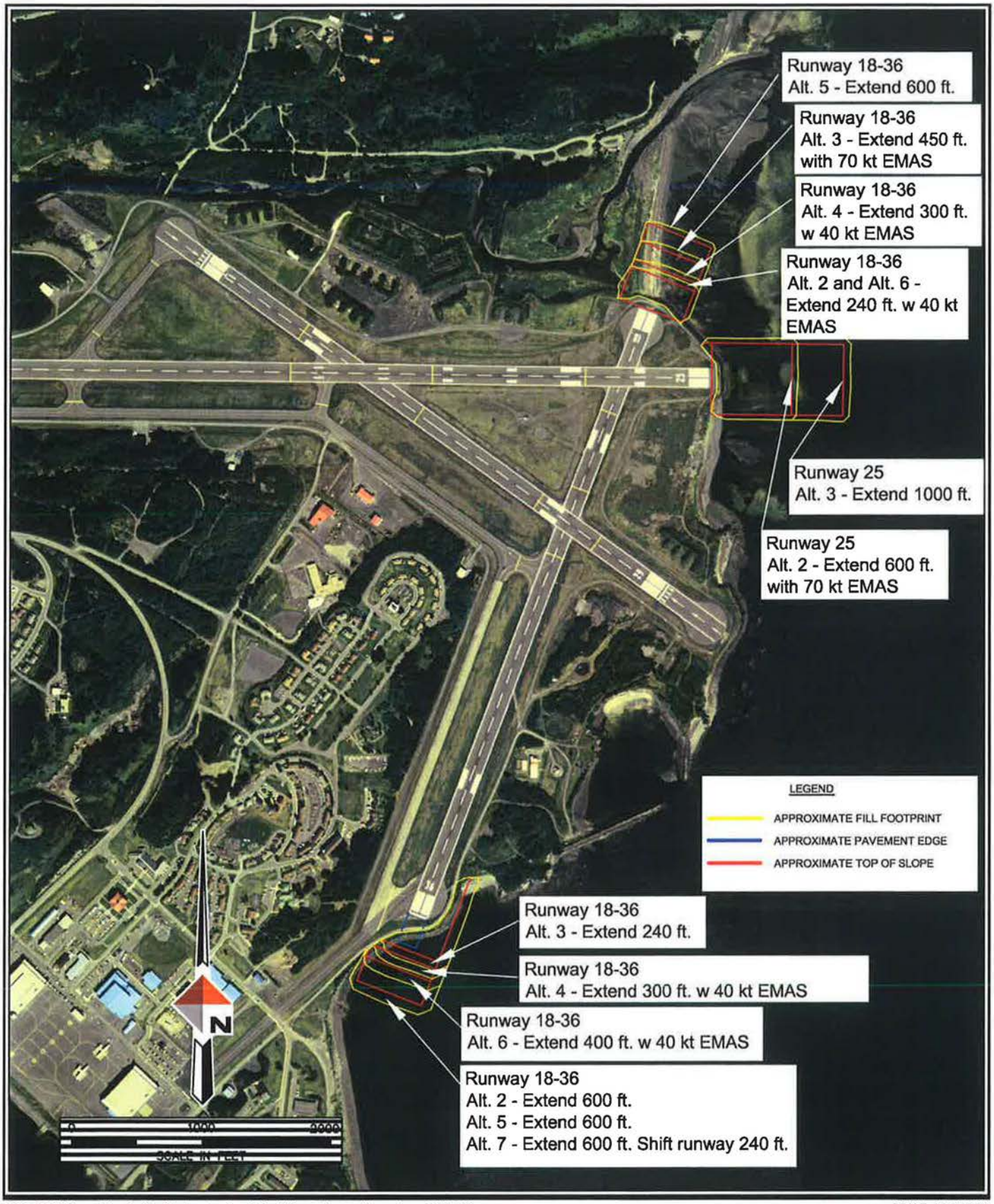
Figure 2 shows the fill footprint of the various alternatives. It is anticipated that a small additional area (less than ten feet) outside of the fill footprint might be impacted by construction activities. Most of this impact will likely be due to the placement of fill and armor material by construction equipment and by the installation of temporary sediment controls.

3.4 Quantities

Depending on the combination alternatives selected for construction, a range of material quantities may be required. Table 2 shows the range of materials potentially required for each runway and the totals for both runways. Some items have a minimum quantity of zero because most of the alternatives does not include new runway pavement. For detailed quantity estimates for each alternative, see Appendix 1.

Table 2: Estimate of Materials Required for Project

Material	Minimum (cubic yards)	Maximum (cubic yards)
Runway 25		
Embankment	229,000	425,400
Underlayer Stone (medium)	14,000	20,100
Armor Stone (large)	22,400	32,100
Crushed Aggregate Base Course	400	1,200
Sub base Course	0	3,400
Runway 18-36		
Embankment	248,900	590,000
Underlayer Stone (medium)	18,600	28,400
Armor Stone (large)	27,000	41,000
Crushed Aggregate Base Course	800	1,900
Sub base Course	0	4,000
Totals		
Embankment	477,900	1,015,400
Underlayer Stone (medium)	32,600	48,500
Armor Stone (large)	49,400	73,100
Crushed Aggregate Base Course	1,200	3,100
Sub base Course	0	7,400



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AREA AFFECTED BY FILL
Kodiak EIS
Kodiak, Alaska

FIGURE 2

4.0 MATERIAL SOURCES

Potential material sources were identified from previous gravel studies and a review of existing sources. A total of 23 potential sites were identified. Fifteen of these sites have been used as material sources in the past, but may or may not be currently in use as sources.

Based on a review of previous studies and short site visits to several of the sites, it appears that there is adequate gravel on the Kodiak road system, but that the large quantity of gravel fill required for this project may not be available from a single site. It is likely that several sites will be used as material sources. Which sites are eventually used is a function of whether certain sites are being used for other projects at the time of construction and which sites can obtain environmental permits.

Three on-airport sites were included in this review. These sites were reviewed because use of an on-airport site could potentially speed construction and reduce fill costs.

Most of the rock on Kodiak Island is of fairly poor quality and breaks apart easily when disturbed. Therefore, the potential for finding large armor rock on the island is low. Only one of the potential sources is thought to be a source of granite to be used as large armor rock. This site, Shakmanof Cove, is located on the far north end of Kodiak Island and is off the existing road system. This site has never been used as a material source in the past, but the site's owners have indicated that they would like to develop the site. Material from Shakmanof Cove would have to be barged to the airport and would likely have costs similar to material brought from other sites off the island.

Medium-sized underlayer stone can be found at some locations on Kodiak Island, but its occurrence varies from site to site. It is assumed that sufficient quantities of underlayer stone will be found at sites on the Kodiak road system.

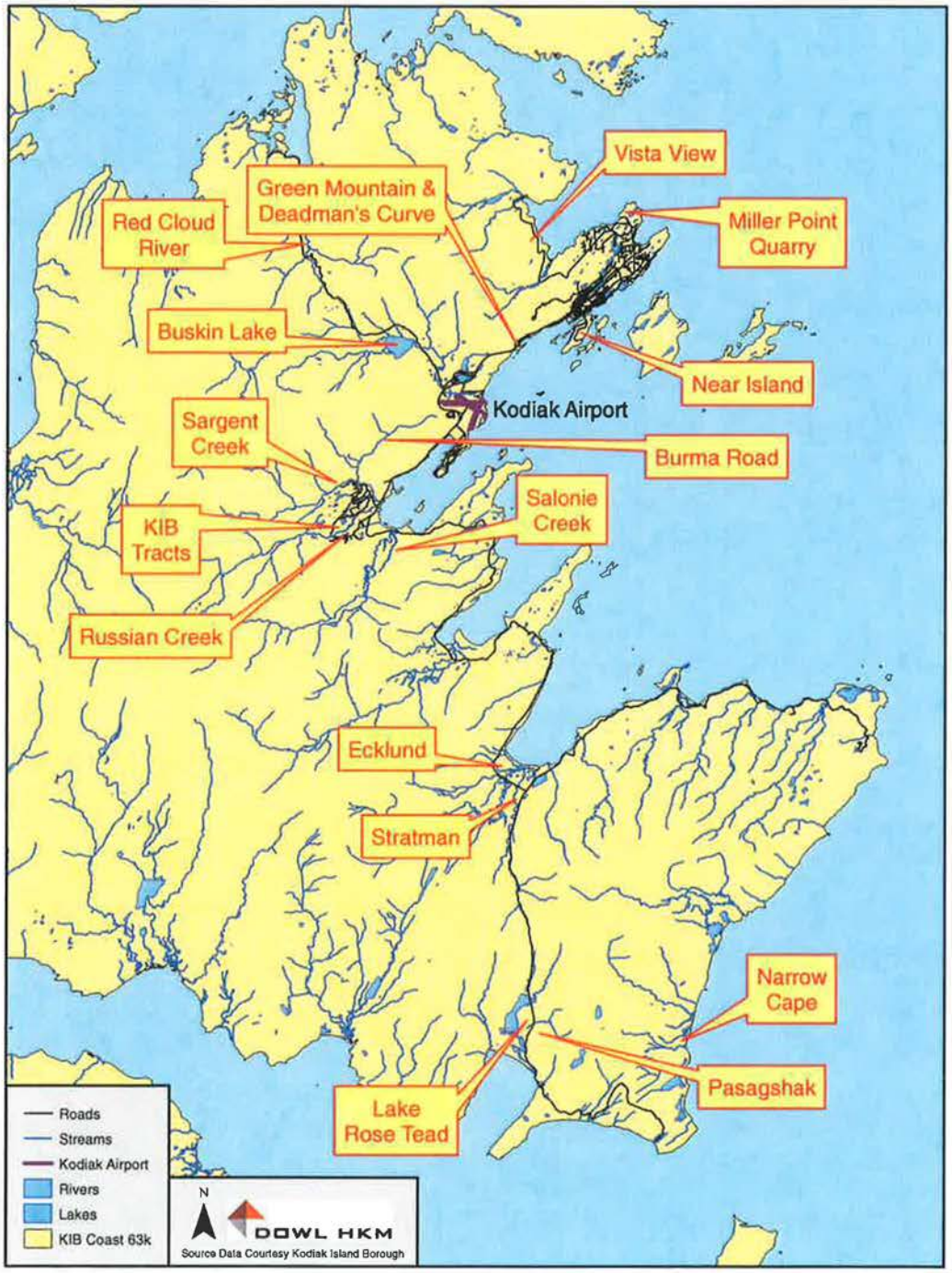


Figure 3: Existing Material Sites

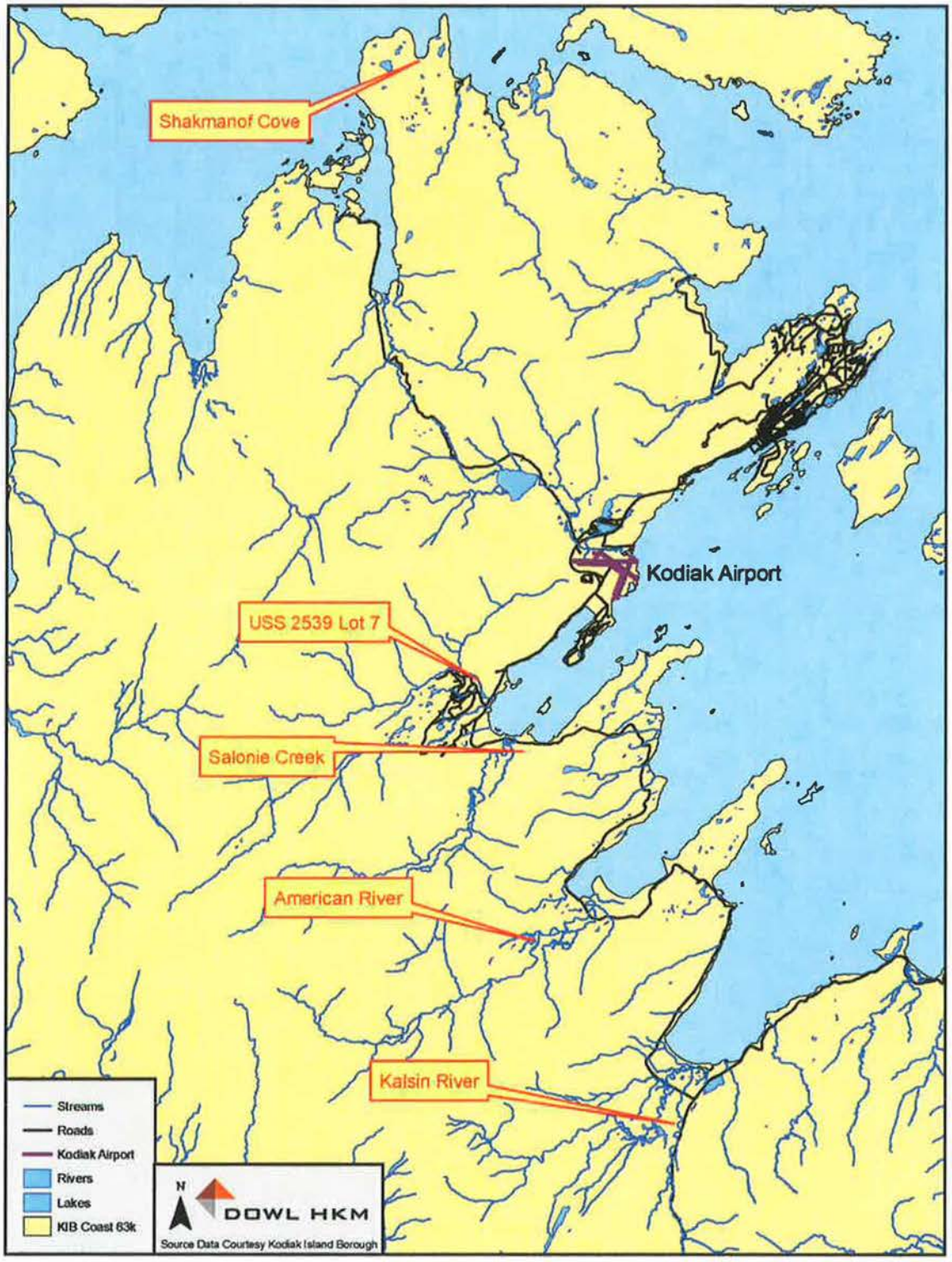


Figure 4: Potential Material Sources

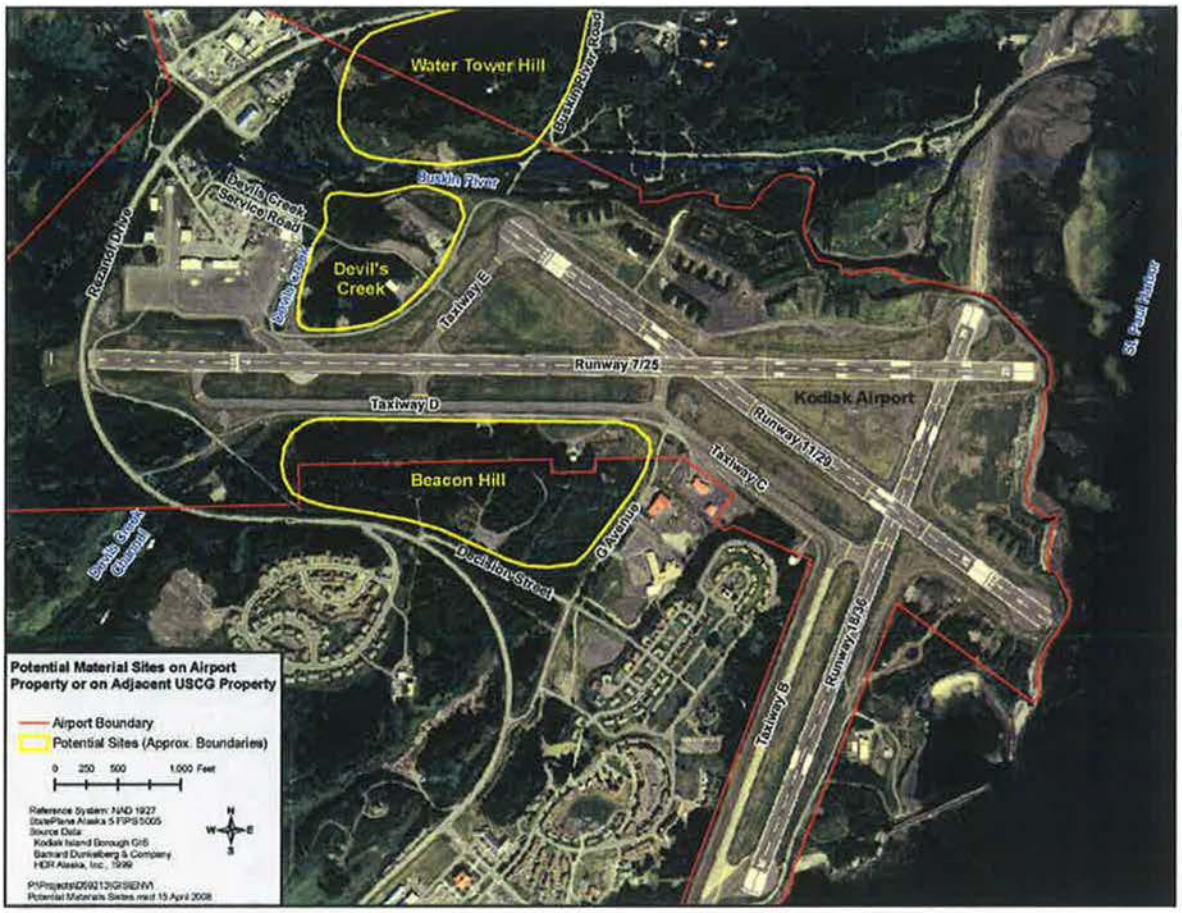


Figure 5: Potential On-Airport Material Sources

5.0 MATERIAL PLACEMENT

5.1 Construction Techniques

Construction of the new embankment will be carried out through conventional means of earthmoving equipment to load trucks and barges that will haul materials to the site where they will be placed. Embankment materials will likely be placed by conventional end dump methods from the existing RSA embankments.

It is likely that the armor stone will require a supplemental off island source that will be hauled to the site by barge. Armor rock will likely be placed into its final location with a crane or loader.

5.2 General Work Sequence

The contractor will initially construct a small layer of gravel to just above the high tide elevation. This material will likely be placed at low tide, but will be difficult to compact due to the saturation of water at high tide. Additional materials will then be added above the high tide elevation in lifts that can be compacted through conventional means. The contractor will likely follow the standard practice of using floating silt curtains to contain turbid waters during fill placement.

5.3 Safety Plan Considerations

A detailed construction phasing plan will be developed concurrent with project design to address how the airfield will operate during each construction phase. The goal of the construction phasing plan will be to minimize, to the extent possible, negative affects to the operational capability of the airport, with special consideration given to commercial service and U.S. Coast Guard operations. It is anticipated that work would be sequenced so the contractor would only work on one runway at a time to minimize disruptions to use of the airport. If during construction on a runway, the runway can remain active, prior to starting work in the safety area, the thresholds would be displaced by installing temporary lighting, temporary markings and issuing NOTAM's. Alternatively, it may be necessary to close the runway completely for landings and take offs during portions or all of the construction for the runway. All hauling operations on the airport will be conducted outside the existing runway and taxiway safety areas while they are open for aircraft use. If one or more of the runways and taxiways are closed to air traffic, either intermittently during low aircraft activity or through the duration of the construction phase, the pavement or associated safety areas may be used as haul routes. Flaggers and other traffic control measures are expected during construction. The contractor will also be required to clear the work area from the runway safety area on short notice for large aircraft arrivals and departures. It is not anticipated that construction would affect use of nearby taxiways.

5.4 Equipment Used For Placement

Hauling from off-airport sites will result in longer cycle times and require trucks that meet local and state requirements for operating on public roadways. These trucks will generally be limited

to ten to fifteen cubic yards in size. It is estimated that between ten and fifteen trucks will be required for an efficient hauling operation from an off-airport material site.

On-airport hauling can be conducted with similar highway vehicles or the contractor may choose to use off-highway equipment with much larger capacities that will shorten the hauling duration. The on-airport vehicles could generally be assumed to be in the ten to thirty cubic yard range for size. It is estimated that four of these larger vehicles would be required for an efficient hauling operation from an on-airport material site.

Off-island material sites will likely require the use of barges to transport material to a barge landing area and trucks and loading equipment to haul and place the material at the airport work site. The deeper areas such as the Runway 36 end will probably have material placed directly from the barge at the site. The other shallower locations will likely require off loading and hauling to the site. This would be required because contractors generally do not like to ground the barges during low tides especially on uneven and potentially rocky areas.

The number size and type of equipment to be used for construction will vary greatly depending on the available material sources, quantities required and the contractor selected.

6.0 HAUL ROUTES

Three potential on-island sources are identified in the draft *Material Site Evaluation* performed by DOWL HKM. These material sites, haul routes and potential barge landing sites are shown in Figure 6.

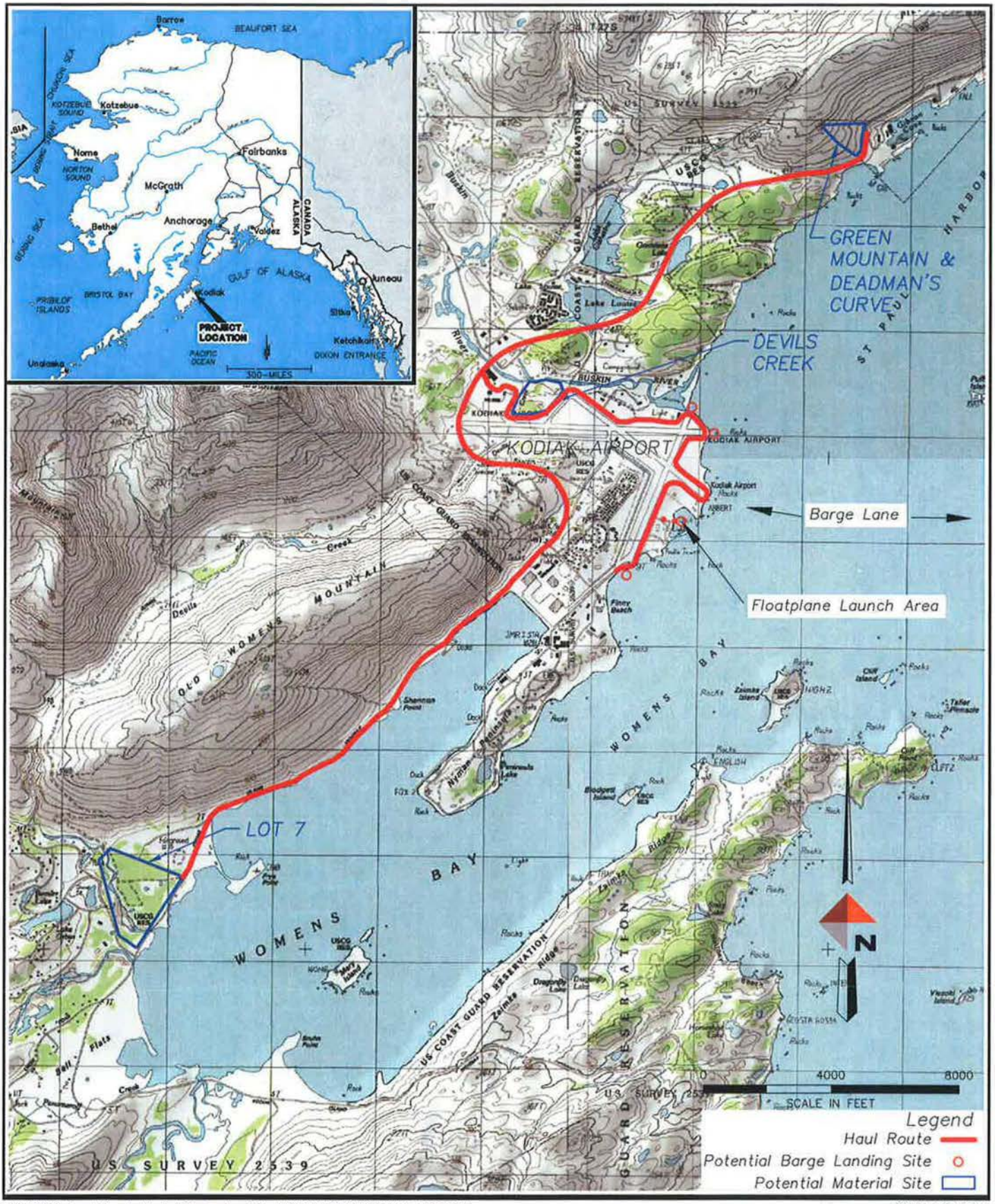
6.1 Barge Landing/Unloading Areas

Ideally, the material to be barged in would be offloaded at the area where it is needed at the ends of the runways. The ability to offload material directly to the work site will depend on the availability of a smooth bottom so that the barges can be grounded at low tide without damage.

Being able to offload directly from the barges would require the least amount of material re-handling and would reduce overall cost. In addition to the ends of the runways, other offloading sites may be used if necessary. Specific site locations will be coordinated between DOT&PF and U.S. Coast Guard and will depend on the needs of the construction contractor and the requirements not to interfere with airport and Coast Guard operations. Potential sites might include the Coast Guard harbor, the floatplane ramp, and other sites on and around the Coast Guard facility.

6.2 Haul Route Upgrades and Temporary Improvements

The General Contract Provisions will have standard requirements for haul route maintenance. Contract Provisions generally state that portions of the haul route may require improvement to support the contractors operations and that the contractor is responsibility for improving the routes as required. Additionally, haul routes shall be restored to their original condition at the end of the project. The condition of haul routes is documented prior to commencement of work by the Contractor and, after construction is completed, the haul routes are compared and the contractor is required to repair damages attributable to their operations.



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DOWL HKM

Haul Routes and Barge Landings
Kodiak EIS
Kodiak, Alaska

FIGURE 6

7.0 Construction Schedule

A construction schedule and phasing plan will be developed by DOT&PF concurrent with project design. It is anticipated that work will be completed by 2014; although, project implementation will depend upon the receipt and programming of project funding as well as project phasing considerations. Prior to project design, DOT&PF will coordinate with the FAA to ensure potential impacts to airport users, including the U.S. Coast Guard, are considered early as well as to ensure the changes to approach and departure procedures are completed for the runway prior to or shortly after reopening. The project will be phased so that work will not occur on more than one runway at a time. Work will be scheduled to minimize impacts to operations by large aircraft such as Alaska Airlines 737s and Coast Guard C-130s. For these aircraft, off-peak season is typically in the November to March timeframe and work during this time would have the fewest impacts to their operations. However, some construction activities might need to occur during other times of the year. Close coordination with the airlines and Coast Guard will be required during development of the construction schedule.

The construction schedule for most of this project can be year-round because of the mild climate in Kodiak. However, the contractor may choose to stop work during some winter months due to the cold temperatures and lack of daylight. There are no other seasonal construction constraints on the placement of the embankment, underlayer, and armor stone. The finished surfaces such as subbase, crushed aggregates, paving and EMAS would be required to be completed during the summer season, preferably in the June to September timeframe.

Preliminary hauling estimates indicate that, if an on-airport site is used, the contractor would be hauling material out of that site for 30 to 60 days, 10 hours a day. Other off-airport sites would require hauling operations for 45 to 90 days, 10 hours a day. The contractor will likely not be hauling material from multiple sites simultaneously and will probably work 6 days a week depending on the contractor. Hauling of fill would likely require 6 to 9 months of work.

It is likely that seasonal constraints would stretch the work out over multiple construction seasons. The first year would probably allow construction of the fill sections for one of the runways. The second construction season would allow construction of the fill sections for the

second runway along with finish work on the first runway. Finish work on the second runway would probably not take place until the third construction season. Thus, the project would likely stretch over portions of at least three years.

7.1 Special Schedule Considerations

There have not been any geotechnical borings conducted in the areas off the ends of the runways and therefore no geotechnical recommendations for the design of the RSA fill sections. However, based on similar projects in Alaska, the new embankment areas may require a surcharge of material or longer term monitoring of compaction and settling within the embankments prior to completion of surface items such as final grading and construction of runway pavements. This is due to the fact that the bottom layer of material at each runway end will be saturated at high tide during construction and traditional methods of compaction may not work. Long-term monitoring of compaction is likely to be less costly than a surcharge of material, but could require a waiting period of between 12 and 24 months between embankment construction and project completion.

APPENDIX 1 - DETAILED QUANTITY ESTIMATES

Kodiak Airport - EIS Preliminary Quantities - February, 2012

R/W 07-25 Alternative 2 – 600' RSA beyond R/W 25 landing threshold with 70-kt EMAS (340'x170')

Pay Item	Description	RSA Length (ft)	EMAS length (ft)	EMAS width (ft)	Blastpad length(ft)	Blastpad width (ft)	Length (ft)	Thickness (ft)	Height (ft)	Slant Length (ft)	SF	CF	CY	TN	+5%
Runway 25 RSA		600													
P-152a	Unclassified Excavation												6,900		7,245
P-152h	Borrow												218,070		228,974
P-154	Subbase Course		340	170				1.5				86,700	3,211		3,372
P-185a	Primary Armor Stone (large)						1830	8	17.5	39.2		573,888	21,255		22,318
P-185b	Underlayer Stone (medium)						1830	5	17.5	39.2		358,680	13,284		13,949
P-209	Crushed Aggregate Base Course		340	200	260	200		0.25				30,000	1,111		1,167
P-401a	Hot Mix Asphalt		340	200	260	200		0.167				20,000		1,500	1,575
P-401c	Asphalt Cement													90	95
P-XXX	EMAS System		340	170							57800				57,800
P-XXX	Perimeter Road Realignment						2165								2,273

P-401a *Use 150lb/cf conversion
P-401c *Use AC=6% of HMA

Side Slope		*Slant Height
H	V	multiplier
2	1	2.24

Assumptions:

1. Side slope of embankment **2:1** (fill) or **7:1** (cut)
2. All unclassified excavation assumed unusable
3. EMAS
   - Mobilization, design, and construction engineering costs do not include EMAS costs because the EMAS price already includes these items for the EMAS system
   - EMAS bed base surface: **2"** HMA, **4"** CABC, **18"** subbase
4. Primary Armor Stone (large)
   - Installed on all sides of RW 25 RSA
   - Stone is at least **5-ft** in diameter installed in two **(2)** layers with a total thickness of **8-ft**
5. Underlayer Stone (medium)
   - Installed beneath all large rip-rap
   - Underlayer stone about **2-3 ft** in diameter installed in two layers with a total thickness of **5-ft**
6. Perimeter road costs based on a 24 ft wide cross section with
   - 6 inches P-209 Chrushed Aggregate Base Course
   - 3 inches P-401 HMA

R/W 07-25 Alternative 3 – 1000' RSA beyond R/W 25 landing threshold

Pay Item	Description	RSA Length (ft)	EMAS length (ft)	EMAS width (ft)	Blastpad length(ft)	Blastpad width (ft)	Length (ft)	Thickness (ft)	Height (ft)	Slant Length (ft)	SF	CF	CY	TN	+5%
Runway 25 RSA		1000													
P-152a	Unclassified Excavation												6,921		7,267
P-152h	Borrow												405,149		425,406
P-154	Subbase Course							1.5				0	0		0
P-185a	Primary Armor Stone (large)						2630	8	17.5	39.2		824,768	30,547		32,074
P-185b	Underlayer Stone (medium)						2630	5	17.5	39.2		515,480	19,092		20,046
P-209	Crushed Aggregate Base Course				200	200		0.25				10,000	370		389
P-401a	Hot Mix Asphalt				200	200		0.167				6,680		501	526
P-401c	Asphalt Cement													30	32
P-XXX	EMAS System										0				0
P-XXX	Perimeter Road Realignment						2970								3,119

P-401a *Use 150lb/cf conversion
P-401c *Use AC=6% of HMA

Side Slope		*Slant Height
H	V	multiplier
2	1	2.24

Assumptions:

1. Side slope of embankment **2:1** (fill) or **7:1** (cut)
2. All unclassified excavation assumed unusable
3. EMAS
   - Mobilization, design, and construction engineering costs do not include EMAS costs because the EMAS price already includes these items for the EMAS system
   - EMAS bed base surface: **2"** HMA, **4"** CABC, **18"** subbase
4. Primary Armor Stone (large)
   - Installed on all sides of RW 25 RSA
   - Stone is at least **5-ft** in diameter installed in two **(2)** layers with a total thickness of **8-ft**
5. Underlayer Stone (medium)
   - Installed beneath all large rip-rap
   - Underlayer stone about **2-3 ft** in diameter installed in two layers with a total thickness of **5-ft**
6. Perimeter road costs based on a 24 ft wide cross section with
   - 6 inches P-209 Chrushed Aggregate Base Course
   - 3 inches P-401 HMA

R/W 18-36 Alternative 2 - 240' RSA beyond R/W 18 w/ 40-kt EMAS (155'x170') and 600' RSA beyond R/W 36

Pay Item	Description	RSA Length (ft)	EMAS length (ft)	EMAS width (ft)	Blastpad length(ft)	Blastpad width (ft)	Length (ft)	Thickness (ft)	Height (ft)	Slant Length (ft)	SF	CF	CY	TN	+5%
Runway 18 RSA		240													
P-152a	Unclassified Excavation												11,278		11,842
P-152h	Borrow												41,838		43,930
P-154	Subbase Course		155	200				1.5				46,500	1,722		1,808
P-185a	Primary Armor Stone (large)						635	8	15	33.6		170,688	6,322		6,638
P-185b	Underlayer Stone (medium)						795	5	15	33.6		133,560	4,947		5,194
P-209	Crushed Aggregate Base Course		155	200	85	200		0.25				12,000	444		467
P-401a	Hot Mix Asphalt		155	200	85	200		0.167				8,016		601	631
P-401c	Asphalt Cement													36	38
P-XXX	EMAS System		155	170							26350				26,350
P-XXX	Perimeter Road Realignment						990								1,040

Runway 36 RSA		600													
P-152a	Unclassified Excavation												22,941		24,088
P-152h	Borrow												413,237		433,899
P-154	Subbase Course							1.5				0	0		0
P-185a	Primary Armor Stone (large)						1722	8	25	56		771,456	28,572		30,001
P-185b	Underlayer Stone (medium)						1919	5	25	56		537,320	19,901		20,896
P-209	Crushed Aggregate Base Course				200	200		0.25				10,000	370		389
P-401a	Hot Mix Asphalt				200	200		0.167				6,680		501	526
P-401c	Asphalt Cement													30	32
P-XXX	EMAS System										0				0
P-XXX	Perimeter Road Realignment						1390								1,460

P-401a *Use 150lb/cf conversion
P-401c *Use AC=6% of HMA

Side Slope		*Slant Height
H	V	multiplier
2	1	2.24

Assumptions:

1. Side slope of embankment **2:1** (fill) or **7:1** (
2. All unclassified excavation assumed unusable
3. EMAS
   - Mobilization, design, and construction engineering costs do not include EMAS costs because the EMAS price already includes these items for the EMAS system
   - EMAS bed base surface: **2"** HMA, **4"** CABC, **18"** subbase
4. Primary Armor Stone (large)
   - Installed only on east, north, and south sides of RW 18-36 RSA to an elevation of **20-ft MSL**
   - Stone is at least **5-ft** in diameter installed in two **(2)** layers with a total thickness of **8-ft**
5. Underlayer Stone (medium)
   - Installed beneath all large rip-rap
   - Underlayer stone about **2-3 ft** in diameter installed in two layers with a total thickness of **5-ft**
   - Medium underlayer stone to be installed on west side of RW 18 RSA to prevent river erosion
6. Perimeter road costs based on a 24 ft wide cross section with
   - 6 inches P-209 Chrushed Aggregate Base Course
   - 3 inches P-401 HMA

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R/W 18-36 Alternative 3 - 450' RSA beyond R/W 18 with 70-kt EMAS (340'x170') and 240' RSA beyond R/W 36

Pay Item	Description	RSA Length (ft)	EMAS length (ft)	EMAS width (ft)	Blastpad length(ft)	Blastpad width (ft)	Length (ft)	Thickness (ft)	Height (ft)	Slant Length (ft)	SF	CF	CY	TN	+5%
Runway 18 RSA		450													
P-152a	Unclassified Excavation												11,332		11,899
P-152h	Borrow												97,715		102,601
P-154	Subbase Course		340	200				1.5				102,000	3,778		3,967
P-185a	Primary Armor Stone (large)						900	8	15	33.6		241,920	8,960		9,408
P-185b	Underlayer Stone (medium)						1060	5	15	33.6		178,080	6,596		6,925
P-209	Crushed Aggregate Base Course		340	200	110	200		0.25				22,500	833		875
P-401a	Hot Mix Asphalt		340	200	110	200		0.167				15,030		1,127	1,184
P-401c	Asphalt Cement													68	71
P-XXX	EMAS System		340	170							57800				57,800
P-XXX	Perimeter Road Realignment						1410								1,481

Runway 36 RSA		240													
P-152a	Unclassified Excavation												22,815		23,956
P-152h	Borrow												141,946		149,044
P-154	Subbase Course							1.5				0	0		0
P-185a	Primary Armor Stone (large)						1070	8	25	56		479,360	17,754		18,642
P-185b	Underlayer Stone (medium)						1070	5	25	56		299,600	11,096		11,651
P-209	Crushed Aggregate Base Course				200	200		0.25				10,000	370		389
P-401a	Hot Mix Asphalt				200	200		0.167				6,680		501	526
P-401c	Asphalt Cement													30	32
P-XXX	EMAS System										0				0
P-XXX	Perimeter Road Realignment						820								861

P-401a *Use 150lb/cf conversion
P-401c *Use AC=6% of HMA

Side Slope H	Side Slope V	*Slant Height multiplier
2	1	2.24

Assumptions:

1. Side slope of embankment **2:1** (fill) or **7:1** (cut)
2. All unclassified excavation assumed unusable
3. EMAS
   - Mobilization, design, and construction engineering costs do not include EMAS costs because the EMAS price already includes these items for the EMAS system
   - EMAS bed base surface: **2"** HMA, **4"** CABC, **18"** subbase
4. Primary Armor Stone (large)
   - Installed only on east, north, and south sides of RW 18-36 RSA to an elevation of **20-ft MSL**
   - Stone is at least **5-ft** in diameter installed in two **(2)** layers with a total thickness of **8-ft**
5. Underlayer Stone (medium)
   - Installed beneath all large rip-rap
   - Underlayer stone about **2-3 ft** in diameter installed in two layers with a total thickness of **5-ft**
   - Medium underlayer stone to be installed on west side of RW 18 RSA to prevent river erosion
6. Perimeter road costs based on a 24 ft wide cross section with
   - 6 inches P-209 Chrushed Aggregate Base Course
   - 3 inches P-401 HMA

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R/W 18-36 Alternative 4 - 300' RSA beyond R/W 18 with 40-kt EMAS (155'x170') and 300' RSA beyond R/W 36 with 40-kt EMAS (155'x170')

Pay Item	Description	RSA Length (ft)	EMAS length (ft)	EMAS width (ft)	Blastpad length(ft)	Blastpad width (ft)	Length (ft)	Thickness (ft)	Height (ft)	Slant Length (ft)	SF	CF	CY	TN	+5%
Runway 18 RSA		300													
P-152a	Unclassified Excavation												11,297		11,862
P-152h	Borrow												58,338		61,255
P-154	Subbase Course		155	200				1.5				46,500	1,722		1,808
P-185a	Primary Armor Stone (large)						666	8	15	33.6		179,021	6,630		6,962
P-185b	Underlayer Stone (medium)						826	5	15	33.6		138,768	5,140		5,397
P-209	Crushed Aggregate Base Course		155	200	145	200		0.25				15,000	556		583
P-401a	Hot Mix Asphalt		155	200	145	200		0.167				10,020		752	789
P-401c	Asphalt Cement													45	47
P-XXX	EMAS System		155	170							26350				26,350
P-XXX	Perimeter Road Realignment						990								1,040

Pay Item	Description	RSA Length (ft)	EMAS length (ft)	EMAS width (ft)	Blastpad length(ft)	Blastpad width (ft)	Length (ft)	Thickness (ft)	Height (ft)	Slant Length (ft)	SF	CF	CY	TN	+5%
Runway 36 RSA		300													
P-152a	Unclassified Excavation												22,832		23,974
P-152h	Borrow												178,625		187,556
P-154	Subbase Course		155	200				1.5				46,500	1,722		1,808
P-185a	Primary Armor Stone (large)						1147	8	25	56		513,856	19,032		19,983
P-185b	Underlayer Stone (medium)						1343	5	25	56		376,040	13,927		14,624
P-209	Crushed Aggregate Base Course		155	200	145	200		0.25				15,000	556		583
P-401a	Hot Mix Asphalt		155	200	145	200		0.167				10,020		752	789
P-401c	Asphalt Cement													45	47
P-XXX	EMAS System		155	170							26350				26,350
P-XXX	Perimeter Road Realignment						820								861

P-401a *Use 150lb/cf conversion
P-401c *Use AC=6% of HMA

Side Slope H	Side Slope V	*Slant Height multiplier
2	1	2.24

Assumptions:

1. Side slope of embankment **2:1** (fill) or **7:1** (cut)
2. All unclassified excavation assumed unusable
3. EMAS
   - Mobilization, design, and construction engineering costs do not include EMAS costs because the EMAS price already includes these items for the EMAS system
   - EMAS bed base surface: **2"** HMA, **4"** CABC, **18"** subbase
4. Primary Armor Stone (large)
   - Installed only on east, north, and south sides of RW 18-36 RSA to an elevation of **20-ft MSL**
   - Stone is at least **5-ft** in diameter installed in two **(2)** layers with a total thickness of **8-ft**
5. Underlayer Stone (medium)
   - Installed beneath all large rip-rap
   - Underlayer stone about **2-3 ft** in diameter installed in two layers with a total thickness of **5-ft**
   - Medium underlayer stone to be installed on west side of RW 18 RSA to prevent river erosion
6. Perimeter road costs based on a 24 ft wide cross section with
   - 6 inches P-209 Chrushed Aggregate Bas
   - 3 inches P-401 HMA

R/W 18-36 Alternative 5 - 600' RSA beyond R/W 18 and 600' RSA beyond R/W 36

Pay Item	Description	RSA Length (ft)	EMAS length (ft)	EMAS width (ft)	Blastpad length(ft)	Blastpad width (ft)	Length (ft)	Thickness (ft)	Height (ft)	Slant Length (ft)	SF	CF	CY	TN	+5%
Runway 18 RSA		600													
P-152a	Unclassified Excavation												11,432		12,004
P-152h	Borrow												148,518		155,944
P-154	Subbase Course							1.5				0	0		0
P-185a	Primary Armor Stone (large)						1046	8	15	33.6		281,165	10,414		10,934
P-185b	Underlayer Stone (medium)						1206	5	15	33.6		202,608	7,504		7,879
P-209	Crushed Aggregate Base Course				200	200		0.25				10,000	370		389
P-401a	Hot Mix Asphalt				200	200		0.167				6,680		501	526
P-401c	Asphalt Cement													30	32
P-XXX	EMAS System										0				0
P-XXX	Perimeter Road Realignment						1590								1,670

Runway 36 RSA		600													
P-152a	Unclassified Excavation												22,941		24,088
P-152h	Borrow												413,237		433,899
P-154	Subbase Course							1.5				0	0		0
P-185a	Primary Armor Stone (large)						1722	8	25	56		771,456	28,572		30,001
P-185b	Underlayer Stone (medium)						1919	5	25	56		537,320	19,901		20,896
P-209	Crushed Aggregate Base Course				200	200		0.25				10,000	370		389
P-401a	Hot Mix Asphalt				200	200		0.167				6,680		501	526
P-401c	Asphalt Cement													30	32
P-XXX	EMAS System										0				0
P-XXX	Perimeter Road Realignment						1390								1,460

P-401a *Use 150lb/cf conversion
P-401c *Use AC=6% of HMA

Side Slope		*Slant Height
H	V	multiplier
2	1	2.24

Assumptions:

1. Side slope of embankment **2:1** (fill) or **7:1** (cut)
2. All unclassified excavation assumed unusable
3. EMAS
   - Mobilization, design, and construction engineering costs do not include EMAS costs because the EMAS price already includes these items for the EMAS system
   - EMAS bed base surface: **2"** HMA, **4"** CABC, **18"** subbase
4. Primary Armor Stone (large)
   - Installed only on east, north, and south sides of RW 18-36 RSA to an elevation of **20-ft MSL**
   - Stone is at least **5-ft** in diameter installed in two **(2)** layers with a total thickness of **8-ft**
5. Underlayer Stone (medium)
   - Installed beneath all large rip-rap
   - Underlayer stone about **2-3 ft** in diameter installed in two layers with a total thickness of **5-ft**
   - Medium underlayer stone to be installed on west side of RW 18 RSA to prevent river erosion
6. Perimeter road costs based on a 24 ft wide cross section with
   - 6 inches P-209 Chrushed Aggregate Bas
   - 3 inches P-401 HMA

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R/W 18-36 Alternative 6 - 240' RSA beyond R/W 18 with 40-kt EMAS (155'x170') and 400' RSA beyond R/W 36 with 40-kt EMAS (155'x170')

Pay Item	Description	RSA Length (ft)	EMAS length (ft)	EMAS width (ft)	Blastpad length(ft)	Blastpad width (ft)	Length (ft)	Thickness (ft)	Height (ft)	Slant Length (ft)	SF	CF	CY	TN	+5%
Runway 18 RSA		240													
P-152a	Unclassified Excavation												11,278		11,842
P-152h	Borrow												41,838		43,930
P-154	Subbase Course		155	200				1.5				46,500	1,722		1,808
P-185a	Primary Armor Stone (large)						635	8	15	33.6		170,688	6,322		6,638
P-185b	Underlayer Stone (medium)						795	5	15	33.6		133,560	4,947		5,194
P-209	Crushed Aggregate Base Course		155	200	85	200		0.25				12,000	444		467
P-401a	Hot Mix Asphalt		155	200	85	200		0.167				8,016		601	631
P-401c	Asphalt Cement													36	38
P-XXX	EMAS System		155	170							26350				26,350
P-XXX	Perimeter Road Realignment						990								1,040

Pay Item	Description	RSA Length (ft)	EMAS length (ft)	EMAS width (ft)	Blastpad length(ft)	Blastpad width (ft)	Length (ft)	Thickness (ft)	Height (ft)	Slant Length (ft)	SF	CF	CY	TN	+5%
Runway 36 RSA		400													
P-152a	Unclassified Excavation												22,835		23,977
P-152h	Borrow												252,615		265,246
P-154	Subbase Course		155	200				1.5				46,500	1,722		1,808
P-185a	Primary Armor Stone (large)						1307	8	25	56		585,536	21,687		22,771
P-185b	Underlayer Stone (medium)						1503	5	25	56		420,840	15,587		16,366
P-209	Crushed Aggregate Base Course		155	200	245	200		0.25				20,000	741		778
P-401a	Hot Mix Asphalt		155	200	245	200		0.167				13,360		1,002	1,052
P-401c	Asphalt Cement													60	63
P-XXX	EMAS System		155	170							26350				26,350
P-XXX	Perimeter Road Realignment						1192								1,252

P-401a *Use 150lb/cf conversion
P-401c *Use AC=6% of HMA

Side Slope H	Side Slope V	*Slant Height multiplier
2	1	2.24

Assumptions:

1. Side slope of embankment **2:1** (fill) or **7:1** (cut)
2. All unclassified excavation assumed unusable
3. EMAS
   - Mobilization, design, and construction engineering costs do not include EMAS costs because the EMAS price already includes these items for the EMAS system
   - EMAS bed base surface: **2"** HMA, **4"** CABC, **18"** subbase
4. Primary Armor Stone (large)
   - Installed only on east, north, and south sides of RW 18-36 RSA to an elevation of **20-ft MSL**
   - Stone is at least **5-ft** in diameter installed in two **(2)** layers with a total thickness of **8-ft**
5. Underlayer Stone (medium)
   - Installed beneath all large rip-rap
   - Underlayer stone about **2-3 ft** in diameter installed in two layers with a total thickness of **5-ft**
   - Medium underlayer stone to be installed on west side of RW 18 RSA to prevent river erosion
6. Perimeter road costs based on a 24 ft wide cross section with
   - 6 inches P-209 Chrushed Aggregate Bas
   - 3 inches P-401 HMA

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R/W 18-36 Alternative 7 - 240' Runway shift R/W 18 with 40-kt EMAS (155'x170') and 360' RSA beyond R/W 36 (total 600' embankment)

Pay Item	Description	RSA Length (ft)	EMAS length (ft)	EMAS width (ft)	Blastpad length(ft)	Blastpad width (ft)	Length (ft)	Thickness (ft)	Height (ft)	Slant Length (ft)	SF	CF	CY	TN	+5%
Runway 18 RSA		0													
P-152a	Unclassified Excavation														0
P-152h	Borrow														0
P-154	Subbase Course							1.5				0	0		0
P-185a	Primary Armor Stone (large)							8	15	33.6		0	0		0
P-185b	Underlayer Stone (medium)							5	15	33.6		0	0		0
P-209	Crushed Aggregate Base Course							0.25				0	0		0
P-401a	Hot Mix Asphalt		155	200	85	200		0.167				8,016		601	631
P-401c	Asphalt Cement													36	38
P-XXX	EMAS System		155	170							26350				26,350
P-XXX	Perimeter Road Realignment														0
L-XXX	Runway and Threshold lights														14

			Runway length (ft)	Ruwnay width (ft)											
Runway 36 RSA		340													
P-152a	Unclassified Excavation												22,941		24,088
P-152h	Borrow												394,370		414,089
P-154	Subbase Course		240	150				2.0				72,000	2,667		2,800
P-185a	Primary Armor Stone (large)						2228	8	25	56		998,144	36,968		38,817
P-185b	Underlayer Stone (medium)						2543	5	25	56		712,040	26,372		27,690
P-209	Crushed Aggregate Base Course		240	150	200	200		1.00				46,000	1,704		1,789
P-401a	Hot Mix Asphalt		240	150	200	200		0.500				24,680		1,851	1,944
P-401c	Asphalt Cement													111	117
P-XXX	EMAS System										0				0
P-XXX	Perimeter Road Realignment						965								1,013
L-XXX	Runway and Threshold lights														14

P-401a *Use 150lb/cf conversion
P-401c *Use AC=6% of HMA

Side Slope		*Slant Height
H	V	multiplier
2	1	2.24

Assumptions:

1. Side slope of embankment **2:1** (fill) or **7:1** (cut)
2. All unclassified excavation assumed unusable
3. EMAS
   - Mobilization, design, and construction engineering costs do not include EMAS costs because the EMAS price already includes these items for the EMAS system
   - EMAS bed base surface: **2"** HMA, **4"** CABC, **18"** subbase
4. Primary Armor Stone (large)
   - Installed only on east, north, and south sides of RW 18-36 RSA to an elevation of **20-ft MSL**
   - Stone is at least **5-ft** in diameter installed in two **(2)** layers with a total thickness of **8-ft**
5. Underlayer Stone (medium)
   - Installed beneath all large rip-rap
   - Underlayer stone about **2-3 ft** in diameter installed in two layers with a total thickness of **5-ft**
   - Medium underlayer stone to be installed on west side of RW 18 RSA to prevent river erosion
6. Perimeter road costs based on a 24 ft wide cross section with
   - 6 inches P-209 Chrushed Aggregate Bas
   - 3 inches P-401 HMA

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	Cost Estimate
Runway 07/25	
Alternative 2 600' RSA beyond R/W 25 landing threshold w/ 70-kt EMAS (340'x170')	$ 22,152,000
Alternative 3 1000' RSA beyond R/W 25 landing threshold	$ 20,661,000
Runway 18/36	
Alternative 2 240' RSA beyond R/W 18 w/ 40-kt EMAS (155'x170') and 600' RSA beyond R/W 36	$ 27,675,000
Alternative 3 450' RSA beyond R/W 18 w/ 70-kt EMAS (340'x170') and 240' RSA beyond R/W 36	$ 24,791,000
Alternative 4 300' RSA beyond R/W w/ 40-kt EMAS (155'x170') on both R/W ends	$ 24,536,000
Alternative 5 600' RSA beyond R/W on both R/W ends	$ 27,534,000
Alternative 6 240' RSA beyond R/W 18 w/ 40-kt EMAS (155'x170') and 400' RSA beyond R/W 36 with 40-kt EMAS (155'x170')	$ 26,561,000
Alternative 7 R/W 18-36 Alternative 8 - 240' Runway shift with 40-kt EMAS (155'x170') and 360' RSA beyond R/W 36 (total 600' embankment)	$ 27,011,000

Kodiak Airport - EIS Preliminary Cost Estimates - February, 2012
R/W 07-25 Alternative 2 – 600' RSA beyond R/W 25 landing threshold w/ 70-kt EMAS (340'x170')

Pay Item	Description	Quantity	Unit	Unit Price	Item Cost
Runway 25 RSA					
P-152a	Unclassified Excavation	7,250	CY	$ 12	$ 87,000
P-152h	Borrow	229,000	CY	$ 18	$ 4,122,000
P-154	Subbase Course	3,400	CY	$ 30	$ 102,000
P-185a	Primary Armor Stone (large)	22,400	CY	$ 150	$ 3,360,000
P-185b	Underlayer Stone (medium)	14,000	CY	$ 100	$ 1,400,000
P-209	Crushed Aggregate Base Course	1,200	CY	$ 40	$ 48,000
P-401a	Hot Mix Asphalt	1,580	TN	$ 80	$ 126,400
P-401c	Asphalt Cement	95	TN	$ 1,000	$ 95,000
P-XXX	EMAS System	57,800	SF	$ 135	$ 7,803,000
P-XXX	Perimeter Road realignment	2,280	LF	$ 81	$ 184,680
	Contractor Soft Costs	1	LS	$ 1,000,000	$ 1,000,000
				Subtotal	$ 18,328,080
				Mobilization (other than EMAS) (8%)	$ 842,000
				Design (other than EMAS)	$ 1,000,000
				Construction Engineering (other than EMAS) (10%)	$ 1,053,000
				Erosion and Pollution Control	$ 100,000
				ICAP (3.89%)	$ 829,000
				Total	**$ 22,152,000**

Assumptions:

1. Side slope of embankment 2:1 (fill) or 7:1 (cut)
2. All unclassified excavation assumed unusable
3. EMAS
   - Mobilization, design, and construction engineering costs do not include EMAS costs because the EMAS price already includes these items for the EMAS system
   - EMAS bed base surface: 2" HMA, 4" CABC, 18" subbase
4. Primary Armor Stone (large)
   - Installed on all sides of RW 25 RSA
   - Stone is at least 5-ft in diameter installed in two (2) layers with a total thickness of 8-ft
5. Underlayer Stone (medium)
   - Installed beneath all Rip Rap
6. Perimeter road costs based on a 24 ft wide cross section with
   - 6 inches P-209 Chrushed Aggregate Base Course
   - 3 inches P-401 HMA

Kodiak Airport - EIS Preliminary Cost Estimates - February, 2012
R/W 07-25 Alternative 3 – 1000' RSA beyond R/W 25 landing threshold

Pay Item	Description	Quantity	Unit	Unit Price	Item Cost
Runway 25 RSA					
P-152a	Unclassified Excavation	7,300	CY	$ 12	$ 87,600
P-152h	Borrow	425,400	CY	$ 18	$ 7,657,200
P-154	Subbase Course	-	CY	$ 30	$ -
P-185a	Primary Armor Stone (large)	32,100	CY	$ 150	$ 4,815,000
P-185b	Underlayer Stone (medium)	20,100	CY	$ 100	$ 2,010,000
P-209	Crushed Aggregate Base Course	400	CY	$ 40	$ 16,000
P-401a	Hot Mix Asphalt	530	TN	$ 80	$ 42,400
P-401c	Asphalt Cement	40	TN	$ 1,000	$ 40,000
P-XXX	EMAS System	-	SF	$ 135	$ -
P-XXX	Perimeter Road realignment	3,120	LF	$ 81	$ 252,720
	Contractor Soft Costs	1	LS	$ 1,000,000	$ 1,000,000
				Subtotal	$ 15,920,920
				Mobilization (other than EMAS) (8%)	$ 1,274,000
				Design (other than EMAS)	$ 1,000,000
				Construction Engineering (other than EMAS) (10%)	$ 1,592,000
				Erosion and Pollution Control	$ 100,000
				ICAP (3.89%)	$ 774,000
				Total	**$ 20,661,000**

Assumptions:

1. Side slope of embankment 2:1 (fill) or 7:1 (cut)
2. All unclassified excavation assumed unusable
3. EMAS
   - Mobilization, design, and construction engineering costs do not include EMAS costs because the EMAS price already includes these items for the EMAS system
   - EMAS bed base surface: 2" HMA, 4" CABC, 18" subbase
4. Primary Armor Stone (large)
   - Installed on all sides of RW 25 RSA
   - Stone is at least 5-ft in diameter installed in two (2) layers with a total thickness of 8-ft
5. Underlayer Stone (medium)
   - Installed beneath all Rip Rap
6. Perimeter road costs based on a 24 ft wide cross section with
   - 6 inches P-209 Chrushed Aggregate Base Course
   - 3 inches P-401 HMA

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R/W 18-36 Alternative 2 - 240' RSA beyond R/W 18 w/ 40-kt EMAS (155'x170') and 600' RSA beyond R/W 36

Pay Item	Description	Quantity	Unit	Unit Price	Item Cost
Runway 18 RSA					
P-152a	Unclassified Excavation	11,850	CY	$ 12	$ 142,200
P-152h	Borrow	44,000	CY	$ 18	$ 792,000
P-154	Subbase Course	1,810	CY	$ 30	$ 54,300
P-185a	Primary Armor Stone (large)	6,700	CY	$ 150	$ 1,005,000
P-185b	Underlayer Stone (medium)	5,200	CY	$ 100	$ 520,000
P-209	Crushed Aggregate Base Course	470	CY	$ 40	$ 18,800
P-401a	Hot Mix Asphalt	640	TN	$ 80	$ 51,200
P-401c	Asphalt Cement	40	TN	$ 1,000	$ 40,000
P-XXX	EMAS System	26,350	SF	$ 135	$ 3,557,000
P-XXX	Perimeter Road realignment	1,050	LF	$ 81	$ 85,050
Runway 36 RSA					
P-152a	Unclassified Excavation	24,100	CY	$ 12	$ 289,200
P-152h	Borrow	433,900	CY	$ 18	$ 7,810,200
P-154	Subbase Course	-	CY	$ 30	$ -
P-185a	Primary Armor Stone (large)	30,100	CY	$ 150	$ 4,515,000
P-185b	Underlayer Stone (medium)	20,900	CY	$ 100	$ 2,090,000
P-209	Crushed Aggregate Base Course	390	CY	$ 40	$ 15,600
P-401a	Hot Mix Asphalt	530	TN	$ 80	$ 42,400
P-401c	Asphalt Cement	40	TN	$ 1,000	$ 40,000
P-XXX	EMAS System	-	SF	$ 135	$ -
P-XXX	Perimeter Road realignment	1,460	LF	$ 81	$ 118,260
	Contractor Soft Costs	1	LS	$ 1,000,000.00	$ 1,000,000
				Subtotal	$ 22,186,210
				Mobilization (other than EMAS) (8%)	$ 1,490,000
				Design (other than EMAS)	$ 1,000,000
				Construction Engineering (other than EMAS) (10%)	$ 1,863,000
				Erosion and Pollution Control	$ 100,000
				ICAP (3.89%)	$ 1,036,000
				Total	**$ 27,675,000**

Assumptions:

1. Side slope of embankment 2:1 (fill) or 7:1 (cut)
2. All unclassified excavation assumed unusable
3. EMAS
   - Mobilization, design, and construction engineering costs do not include EMAS costs because the EMAS price already includes these items for the EMAS system
   - EMAS bed base surface: 2" HMA, 4" CABC, 18" subbase
4. Primary Armor Stone (large)
   - Installed on all sides of RW 25 RSA
   - Stone is at least 5-ft in diameter installed in two (2) layers with a total thickness of 8-ft
5. Underlayer Stone (medium)
   - Installed beneath all Rip Rap
6. Perimeter road costs based on a 24 ft wide cross section with
   - 6 inches P-209 Chrushed Aggregate Base Course
   - 3 inches P-401 HMA

Kodiak Airport - EIS Preliminary Cost Estimates - February, 2012
R/W 18-36 Alternative 3 - 450' RSA beyond R/W 18 w/ 70-kt EMAS (340'x170') and 240' RSA beyond R/W 36

Pay Item	Description	Quantity	Unit	Unit Price	Item Cost
Runway 18 RSA					
P-152a	Unclassified Excavation	11,900	CY	$ 12	$ 142,800
P-152h	Borrow	102,600	CY	$ 18	$ 1,846,800
P-154	Subbase Course	4,000	CY	$ 30	$ 120,000
P-185a	Primary Armor Stone (large)	9,500	CY	$ 150	$ 1,425,000
P-185b	Underlayer Stone (medium)	7,000	CY	$ 100	$ 700,000
P-209	Crushed Aggregate Base Course	900	CY	$ 40	$ 36,000
P-401a	Hot Mix Asphalt	1,200	TN	$ 80	$ 96,000
P-401c	Asphalt Cement	75	TN	$ 1,000	$ 75,000
P-XXX	EMAS System	57,800	SF	$ 135	$ 7,803,000
P-XXX	Perimeter Road realignment	1,500	LF	$ 81	$ 121,500
Runway 36 RSA					
P-152a	Unclassified Excavation	24,000	CY	$ 12	$ 288,000
P-152h	Borrow	149,100	CY	$ 18	$ 2,683,800
P-154	Subbase Course	-	CY	$ 30	$ -
P-185a	Primary Armor Stone (large)	18,700	CY	$ 150	$ 2,805,000
P-185b	Underlayer Stone (medium)	11,700	CY	$ 100	$ 1,170,000
P-209	Crushed Aggregate Base Course	390	CY	$ 40	$ 15,600
P-401a	Hot Mix Asphalt	530	TN	$ 80	$ 42,400
P-401c	Asphalt Cement	40	TN	$ 1,000	$ 40,000
P-XXX	EMAS System	-	SF	$ 135	$ -
P-XXX	Perimeter Road realignment	870	LF	$ 81	$ 70,470
	Contractor Soft Costs	1	LS	$ 1,000,000.00	$ 1,000,000
				Subtotal	$ 20,481,370
				Mobilization (other than EMAS) (8%)	$ 1,014,000
				Design (other than EMAS)	$ 1,000,000
				Construction Engineering (other than EMAS) (10%)	$ 1,268,000
				Erosion and Pollution Control	$ 100,000
				ICAP (389%)	$ 928,000
				Total	**$ 24,791,000**

Assumptions:

1. Side slope of embankment 2:1 (fill) or 7:1 (cut)
2. All unclassified excavation assumed unusable
3. EMAS
   - Mobilization, design, and construction engineering costs do not include EMAS costs because the EMAS price already includes these items for the EMAS system
   - EMAS bed base surface: 2" HMA, 4" CABC, 18" subbase
4. Primary Armor Stone (large)
   - Installed on all sides of RW 25 RSA
   - Stone is at least 5-ft in diameter installed in two (2) layers with a total thickness of 8-ft
5. Underlayer Stone (medium)
   - Installed beneath all Rip Rap
6. Perimeter road costs based on a 24 ft wide cross section with
   - 6 inches P-209 Chrushed Aggregate Base Course
   - 3 inches P-401 HMA

Kodiak Airport - EIS Preliminary Cost Estimates - February, 2012
R/W 18-36 Alternative 4 - 300' RSA beyond R/W w/ 40-kt EMAS (155'x170') on both R/W ends

Pay Item	Description	Quantity	Unit	Unit Price	Item Cost
Runway 18 RSA					
P-152a	Unclassified Excavation	11,900	CY	$ 12	$ 142,800
P-152h	Borrow	61,300	CY	$ 18	$ 1,103,400
P-154	Subbase Course	1,850	CY	$ 30	$ 55,500
P-185a	Primary Armor Stone (large)	7,000	CY	$ 150	$ 1,050,000
P-185b	Underlayer Stone (medium)	5,400	CY	$ 100	$ 540,000
P-209	Crushed Aggregate Base Course	590	CY	$ 40	$ 23,600
P-401a	Hot Mix Asphalt	790	TN	$ 80	$ 63,200
P-401c	Asphalt Cement	50	TN	$ 1,000	$ 50,000
P-XXX	EMAS System	26,350	SF	$ 135	$ 3,557,000
P-XXX	Perimeter Road realignment	1,050	LF	$ 81	$ 85,050
Runway 36 RSA					
P-152a	Unclassified Excavation	24,000	CY	$ 12	$ 288,000
P-152h	Borrow	187,600	CY	$ 18	$ 3,376,800
P-154	Subbase Course	1,850	CY	$ 30	$ 55,500
P-185a	Primary Armor Stone (large)	20,000	CY	$ 150	$ 3,000,000
P-185b	Underlayer Stone (medium)	14,700	CY	$ 100	$ 1,470,000
P-209	Crushed Aggregate Base Course	590	CY	$ 40	$ 23,600
P-401a	Hot Mix Asphalt	790	TN	$ 80	$ 63,200
P-401c	Asphalt Cement	50	TN	$ 1,000	$ 50,000
P-XXX	EMAS System	26,350	SF	$ 135	$ 3,557,000
P-XXX	Perimeter Road realignment	870	LF	$ 81	$ 70,470
	Contractor Soft Costs	1	LS	$ 1,000,000.00	$ 1,000,000
				Subtotal	$ 19,625,120
				Mobilization (other than EMAS) (8%)	$ 1,285,000
				Design (other than EMAS)	$ 1,000,000
				Construction Engineering (other than EMAS) (10%)	$ 1,607,000
				Erosion and Pollution Control	$ 100,000
				ICAP (3.89%)	$ 919,000
				Total	**$ 24,536,000**

Assumptions:

1. Side slope of embankment 2:1 (fill) or 7:1 (cut)
2. All unclassified excavation assumed unusable
3. EMAS
   - Mobilization, design, and construction engineering costs do not include EMAS costs because the EMAS price already includes these items for the EMAS system
   - EMAS bed base surface: 2" HMA, 4" CABC, 18" subbase
4. Primary Armor Stone (large)
   - Installed on all sides of RW 25 RSA
   - Stone is at least 5-ft in diameter installed in two (2) layers with a total thickness of 8-ft
5. Underlayer Stone (medium)
   - Installed beneath all Rip Rap
6. Perimeter road costs based on a 24 ft wide cross section with
   - 6 inches P-209 Chrushed Aggregate Base Course
   - 3 inches P-401 HMA

Kodiak Airport - EIS Preliminary Cost Estimates - February, 2012
R/W 18-36 Alternative 5 - 600' RSA beyond R/W on both R/W ends

Pay Item	Description	Quantity	Unit	Unit Price	Item Cost
Runway 18 RSA					
P-152a	Unclassified Excavation	12,000	CY	$ 12	$ 144,000
P-152h	Borrow	156,000	CY	$ 18	$ 2,808,000
P-154	Subbase Course	-	CY	$ 30	$ -
P-185a	Primary Armor Stone (large)	10,950	CY	$ 150	$ 1,642,500
P-185b	Underlayer Stone (medium)	7,900	CY	$ 100	$ 790,000
P-209	Crushed Aggregate Base Course	390	CY	$ 40	$ 15,600
P-401a	Hot Mix Asphalt	530	TN	$ 80	$ 42,400
P-401c	Asphalt Cement	32	TN	$ 1,000	$ 32,000
P-XXX	EMAS System	-	SF	$ 135	$ -
P-XXX	Perimeter Road realignment	1,700	LF	$ 81	$ 137,700
Runway 36 RSA					
P-152a	Unclassified Excavation	24,100	CY	$ 12	$ 289,200
P-152h	Borrow	433,900	CY	$ 18	$ 7,810,200
P-154	Subbase Course	-	CY	$ 30	$ -
P-185a	Primary Armor Stone (large)	30,100	CY	$ 150	$ 4,515,000
P-185b	Underlayer Stone (medium)	20,900	CY	$ 100	$ 2,090,000
P-209	Crushed Aggregate Base Course	390	CY	$ 40	$ 15,600
P-401a	Hot Mix Asphalt	530	TN	$ 80	$ 42,400
P-401c	Asphalt Cement	32	TN	$ 1,000	$ 32,000
P-XXX	EMAS System	-	SF	$ 135	$ -
P-XXX	Perimeter Road realignment	1,500	LF	$ 81	$ 121,500
	Contractor Soft Costs	1	LS	$ 1,000,000.00	$ 1,000,000
				Subtotal	$ 21,528,100
				Mobilization (other than EMAS) (8%)	$ 1,722,000
				Design (other than EMAS)	$ 1,000,000
				Construction Engineering (other than EMAS) (10%)	$ 2,153,000
				Erosion and Pollution Control	$ 100,000
				ICAP (3.89%)	$ 1,031,000
				Total	**$ 27,534,000**

Assumptions:

1. Side slope of embankment 2:1 (fill) or 7:1 (cut)
2. All unclassified excavation assumed unusable
3. EMAS
   - Mobilization, design, and construction engineering costs do not include EMAS costs because the EMAS price already includes these items for the EMAS system
   - EMAS bed base surface: 2" HMA, 4" CABC, 18" subbase
4. Primary Armor Stone (large)
   - Installed on all sides of RW 25 RSA
   - Stone is at least 5-ft in diameter installed in two (2) layers with a total thickness of 8-ft
5. Underlayer Stone (medium)
   - Installed beneath all Rip Rap
6. Perimeter road costs based on a 24 ft wide cross section with
   - 6 inches P-209 Chrushed Aggregate Base Course
   - 3 inches P-401 HMA

Kodiak Airport - EIS Preliminary Cost Estimates - February, 2012
R/W 18-36 Alternative 6 - 240' RSA beyond R/W 18 w/ 40-kt EMAS (155'x170')
and 400' RSA beyond R/W 36 with 40-kt EMAS (155'x170')

Pay Item	Description	Quantity	Unit	Unit Price	Item Cost
Runway 18 RSA					
P-152a	Unclassified Excavation	11,900	CY	$ 12	$ 142,800
P-152h	Borrow	44,000	CY	$ 18	$ 792,000
P-154	Subbase Course	1,850	CY	$ 30	$ 55,500
P-185a	Primary Armor Stone (large)	6,700	CY	$ 150	$ 1,005,000
P-185b	Underlayer Stone (medium)	5,200	CY	$ 100	$ 520,000
P-209	Crushed Aggregate Base Course	470	CY	$ 40	$ 18,800
P-401a	Hot Mix Asphalt	640	TN	$ 80	$ 51,200
P-401c	Asphalt Cement	40	TN	$ 1,000	$ 40,000
P-XXX	EMAS System	26,350	SF	$ 135	$ 3,557,000
P-XXX	Perimeter Road realignment	1,050	LF	$ 81	$ 85,050
Runway 36 RSA					
P-152a	Unclassified Excavation	24,000	CY	$ 12	$ 288,000
P-152h	Borrow	265,300	CY	$ 18	$ 4,775,400
P-154	Subbase Course	1,850	CY	$ 30	$ 55,500
P-185a	Primary Armor Stone (large)	22,800	CY	$ 150	$ 3,420,000
P-185b	Underlayer Stone (medium)	16,400	CY	$ 100	$ 1,640,000
P-209	Crushed Aggregate Base Course	800	CY	$ 40	$ 32,000
P-401a	Hot Mix Asphalt	1,100	TN	$ 80	$ 88,000
P-401c	Asphalt Cement	70	TN	$ 1,000	$ 70,000
P-XXX	EMAS System	26,350	SF	$ 135	$ 3,557,000
P-XXX	Perimeter Road realignment	1,020	LF	$ 81	$ 82,620
	Contractor Soft Costs	1	LS	$ 1,000,000.00	$ 1,000,000
				Subtotal	$ 21,275,870
				Mobilization (other than EMAS) (8%)	$ 1,418,000
				Design (other than EMAS)	$ 1,000,000
				Construction Engineering (other than EMAS) (10%)	$ 1,772,000
				Erosion and Pollution Control	$ 100,000
				ICAP (3.89%)	$ 995,000
				Total	**$ 26,561,000**

Assumptions:

1. Side slope of embankment 2:1 (fill) or 7:1 (cut)
2. All unclassified excavation assumed unusable
3. EMAS
   - Mobilization, design, and construction engineering costs do not include EMAS costs because the EMAS price already includes these items for the EMAS system
   - EMAS bed base surface: 2" HMA, 4" CABC, 18" subbase
4. Primary Armor Stone (large)
   - Installed on all sides of RW 25 RSA
   - Stone is at least 5-ft in diameter installed in two (2) layers with a total thickness of 8-ft
5. Underlayer Stone (medium)
   - Installed beneath all Rip Rap
6. Perimeter road costs based on a 24 ft wide cross section with
   - 6 inches P-209 Chrushed Aggregate Base Course
   - 3 inches P-401 HMA

Kodiak Airport - EIS Preliminary Cost Estimates - February, 2012
R/W 18-36 Alternative 7 - 240' Runway shift with 40-kt EMAS (155'x170') beyond R/W 18 and 360' RSA beyond R/W 36 (total 600' embankment)

Pay Item	Description	Quantity	Unit	Unit Price	Item Cost
Runway 18 RSA					
P-152a	Unclassified Excavation	-	CY	$ 12	$ -
P-152h	Borrow	-	CY	$ 18	$ -
P-154	Subbase Course	-	CY	$ 30	$ -
P-185a	Primary Armor Stone (large)	-	CY	$ 150	$ -
P-185b	Underlayer Stone (medium)	-	CY	$ 100	$ -
P-209	Crushed Aggregate Base Course	-	CY	$ 40	$ -
P-401a	Hot Mix Asphalt	650	TN	$ 80	$ 52,000
P-401c	Asphalt Cement	40	TN	$ 1,000	$ 40,000
P-XXX	EMAS System	26,350	SF	$ 135	$ 3,557,000
P-XXX	Perimeter Road realignment	1,050	LF	$ 81	$ 85,050
L-XXX	Ruwnay and Threshold Lights	14	EA	$ 1,600	$ 22,400
Runway 36 RSA					
P-152a	Unclassified Excavation	24,100	CY	$ 12	$ 289,200
P-152h	Borrow	414,100	CY	$ 18	$ 7,453,800
P-154	Subbase Course	2,800	CY	$ 30	$ 84,000
P-185a	Primary Armor Stone (large)	38,900	CY	$ 150	$ 5,835,000
P-185b	Underlayer Stone (medium)	27,700	CY	$ 100	$ 2,770,000
P-209	Crushed Aggregate Base Course	1,790	CY	$ 40	$ 71,600
P-401a	Hot Mix Asphalt	1,950	TN	$ 80	$ 156,000
P-401c	Asphalt Cement	120	TN	$ 1,000	$ 120,000
P-XXX	EMAS System	-	SF	$ 135	$ -
P-XXX	Perimeter Road realignment	1,050	LF	$ 81	$ 85,050
L-XXX	Ruwnay and Threshold Lights	14	EA	$ 1,600	$ 22,400
	Contractor Soft Costs	1	LS	$ 1,000,000.00	$ 1,000,000
				Subtotal	$ 21,643,500
				Mobilization (other than EMAS) (8%)	$ 1,447,000
				Design (other than EMAS)	$ 1,000,000
				Construction Engineering (other than EMAS) (10%)	$ 1,809,000
				Erosion and Pollution Control	$ 100,000
				ICAP (3.89%)	$ 1,011,000
				Total	**$ 27,011,000**

Assumptions:

1. Side slope of embankment 2:1 (fill) or 7:1 (cut)
2. All unclassified excavation assumed unusable
3. EMAS
   - Mobilization, design, and construction engineering costs do not include EMAS costs because the EMAS price already includes these items for the EMAS system
   - EMAS bed base surface: 2" HMA, 4" CABC, 18" subbase
4. Primary Armor Stone (large)
   - Installed on all sides of RW 25 RSA
   - Stone is at least 5-ft in diameter installed in two (2) layers with a total thickness of 8-ft
5. Underlayer Stone (medium)
   - Installed beneath all Rip Rap
6. Perimeter road costs based on a 24 ft wide cross section with
   - 6 inches P-209 Chrushed Aggregate Base Course
   - 3 inches P-401 HMA